

## TITLE OF THE INVENTION

[0001] SCRUBBER AND METHOD OF USING SCRUBBER

## CROSS-REFERENCE TO RELATED APPLICATIONS

[0002] U. S. Provisional Application Serial No. 60/416, 201 filed October 4, 2002.

## STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0003] Not applicable.

## REFERENCE TO A "SEQUENCE LISTING"

[0004] Not applicable.

## BACKGROUND OF THE INVENTION

### FIELD OF THE INVENTION

[0005] The present invention relates to cleaning devices having power rotated brushes and more particularly to such cleaning devices which house the brushes in separate carriages that open and close to receive an item to be cleaned.

### DESCRIPTION OF RELATED ART

[0006] Cleaning dirty household items, for example shovels, grills, pans, dishes, car parts, and so forth, has, in the past, been problematic. Industrial as well as commercial establishments also have problems with cleaning parts and tools. This is due in part because debris has a tendency to tightly adhere to the item, particularly where oils or grease is involved. Thus, people usually resort to manually cleaning the item or may go so far as to discard the item in the garbage so as to avoid time consuming difficult scrubbing.

[0007] A simple example includes grills that are found in most homes. Debris, grease, dirt, fire residue and the like is highly adherent to the surface of the grill and can only be removed by someone physically scrubbing the grill. In the past, wire brushes have been used on grills and tools, but these brushes are crude, quickly rust, and frequently scratch/injure the individual using the brush, even when the individual uses the brush with great care. People even resort to using steel wool for cleaning objects. Then, after these objects are

finally cleaned, the big clean-up must commence, because the debris removed from the object has a tendency to move onto adjacent areas such as counters, sinks, and/or basins making these area filthy.

[0008] Other cleaning methods include use of cleaning fluids and/or chemical cleaning as may be used on oven or stove parts and cleaning in a dishwasher. Steam cleaners can force debris into the air and sonic cleaners have material as well as other limitations. These conventional cleaning methods are both time consuming and/or costly. Although dishwashers have improved cleansing abilities for dishes and the like, but they do not provide adequate mechanical scrubbing, are not portable, and are large and costly. Steam cleaners are not well adapted to contain the debris, fumes or the heated steam produced by the steam cleaning operation.

[0009] Accordingly, it is an object of the present invention to provide a machine that can clean and scrub objects, including hard to clean objects, in a quick and easy manner with a minimal amount of mess and which requires a minimal amount of clean-up.

[0010] Another object is to provide such a machine that is easy to operate and easy to clean.

[0011] Another objective is to enable the use of steam in a containment thereby improving the cleaning efficacy and prevent fumes from escaping.

[0012] A further object is to provide a scrubber for hard to clean articles that has upper and lower hinged carriages, each carriage including rotating scrubbing brushes.

## **BRIEF SUMMARY OF THE INVENTION**

[0013] The present invention provides a scrubber that fills the long felt need for a scrubber which quickly cleans even the most dirty items without making a mess, and without requiring a significant amount of clean-up. The scrubber comprises a motorized washing and scrubbing machine and system to clean a variety of household and industrial items such as, for example, tools,

garden equipment, objects made of metal, wood, plastic and combinations thereof, kitchenware, footwear, sporting equipment, grills, plastic objects and small household objects.

[0014] The scrubber has an interior cleaning zone defined between an upper and a lower carriage that are hinged together. The user simply opens the scrubber and insert objects to be cleaned into the cleansing zone. The upper and lower carriages each include a plurality of motorized brushes for scrubbing an object or objects in the cleaning zone between the carriages. Large objects are held in the cleaning zone using a holder or handle that extends into the cleaning zone from the exterior of the scrubber. Small objects to be cleaned are retained in a basket placed in the cleaning zone.

[0015] Fluids, such as, for example water and detergent, can be introduced into the cleaning zone through common or separate inlets in the upper carriage and spent fluids are discharged from the cleaning zone through a bottom outlet in the lower carriage. If desired, the user can introduce fluids before activating the scrubber or the inlet can be hooked up to any garden spout or faucet to supply water during operation of the scrubber. Different fluids to accommodate different cleaning situations can be used. An exhaust hose extending from the bottom outlet need only sit in a drain enabling the user to direct dirty water and particles removed from the cleaning zone to the sewer.

[0016] The opposite sides of upper and lower carriages meet in a relatively fluid tight closure that serves to contain fluids, debris and fumes in the cleaning zone. Flaps extending from the front and rear edges of the carriages provide a relatively fluid tight closure at the front and rear of the carriages. These flaps over lap and serve to suppress the discharge of fluids from the scrubber. Larger items can protrude through such flaps and the material of the flaps contours with the shape of the item.

[0017] Accordingly, the fluid tight closure along the opposite sides of the carriages and the over lapping flaps at the front and rear surround the cleaning zone to suppress the escape of fluids thereby eliminating the mess associated with present cleaning and scrubbing techniques.

[0018] When a large object such as a shovel or the like is inserted into the cleaning zone, a handle (or a holder for large objects that do not have handles) is accommodated by the flexible rubber flaps that bend around the handle (or holder). This allows the user to stand away from the scrubber and still rotate or otherwise manipulate the object in the cleaning zone for better cleaning and scrubbing particular areas of the object. Although fluid is not completely contained within the scrubber when cleaning such large objects, the quantity of fluid that does leak or escape from the scrubber is relatively small.

[0019] To clean small objects, a small basket, for example a wire mesh basket, which accommodates small objects, is placed into the cleaning zone. The basket effectively prevents small objects from uncontrollably moving about in the scrubber interior.

[0020] An exhaust fan connected to the cleaning zone creates a slight negative pressure in the cleaning zone. This negative pressure helps to move spent cleaning fluids and debris into an exhaust outlet and reduces quantity of fluid that may leak from the scrubber interior.

[0021] The brushes are self-cleaning in that brushes in both the upper and lower carriages respectively rotate in opposite directions and press together so the scraping of one brush against another cleans the respective brushes. Brushes of the upper carriage are prevented from contacting brushes of the lower carriage for safety reasons.

[0022] The brushes also are removable, allowing for worn brushes to be easily replaced. Additionally, brushes made of different materials having different stiffness are easily inserted and removed from the carriages.

[0023] A trigger on the upper carriage can control brush speed and rotational direction. This allows the user to modify both brush speed and direction to further enhance cleaning and scrubbing capabilities. A directed steam inlet is also provided to soften debris and assist in cleaning.

#### **BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS**

[0024] Figure 1 is a side elevation view of the scrubber in a closed position;

[0025] Figure 2 is a front elevation view of the scrubber;

[0026] Figure 3 is a side elevation view of the scrubber in a closed position, partly broken away and in section to show selected internal components;

[0027] Figure 4 is a top perspective view of the scrubber bottom carriage with certain components removed;

[0028] Figure 5 is a perspective view of the scrubber in an open position;

[0029] Figure 6 is perspective view showing a portion of the scrubber top carriage;

[0030] Figure 7 is a schematic view showing the drive system of the scrubber;

[0031] Figure 8 is schematic view showing the scrubber in use;

[0032] Figure 9 is a top view of a basket as may be used with the scrubber of the present invention;

[0033] Figure 10 is a side elevation view of the basket of Figure 9; and

[0034] Figure 11 is a side elevation view of the scrubber showing the basket of Figure 9 and 10 positioned therein.

#### DETAILED DESCRIPTION OF THE INVENTION

[0035] Referring to the drawings, Figure 1 shows the scrubber of the present invention generally indicated at 20. The scrubber comprises a top carriage 22 and a bottom carriage 24 which both carry scrubber brushes 100a and 100b respectively shown in dotted line. A vertical support 26 extending upward from the bottom carriage includes a hinge, a portion of which is shown at 28, that has its pivot point at 30. The hinge in turn is connected to the top carriage 22 allowing the top carriage to articulate or pivot about the pivot point 30 from the closed position as shown in Figure 1 to an open position as shown in Figure 5. Between the top and bottom carriages is a cleaning zone 49.

[0036] As shown in Figure 1, the top carriage 22 has side walls 32, a front wall 34, a rear wall 36 and a top 38. The bottom of the top carriage is

open. Extending through the top 38 are a fluid inlet 40 and a cleaner inlet 42. The top carriage also has a handle 44 and a trigger 46 for purposes of operating brushes within the scrubber set out hereinbelow.

[0037] The top carriage carries a fluid distribution and spray system including a plurality of pipes 39 fixed to the underside of the top 38 (Figures 5 and 7). The pipes are connected to the fluid inlet 40 and are arranged to spray a cleaning fluid such as water or steam down into the cleaning zone 49 between the top and bottom carriages. The fluid inlet 40, in turn, may be connected to any fluid/water source such as a hose, faucet or water spigot (not shown). While the cleaner inlet 42 is shown as communicating directly to the interior of the top carriage (Figures 3 and 7), it should be appreciated that the cleaner inlet also may be connected to the pipes 39. This would allow a cleaner to be intimately mixed with the water in the pipes so that special cleaning compositions and solutions are dispensed into the cleaning zone along with the spray from the pipes.

[0038] While water is mentioned as the fluid introduced into the scrubber through pipes 39, this is for illustrative purposes only and fluids other than water may be pumped into the inlet 40. Additionally, the piping 39 may comprise bendable tubing that diverts fluid flow as the device is opened to reduce spraying of fluids outside the scrubber 20. The user may direct the tubing and a valve may prevent fluid flow when the device is opened.

[0039] Referring again to Figure 1, the bottom carriage 24 is similar to the top carriage in that it has side walls 48, a front wall 50, a rear wall 52 and a bottom 54. The bottom carriage is open at its top and has an outlet 56 that extends from the rear wall adjacent its bottom. A latch 58 pivotally attached to a side wall 48 of the bottom carriage can engage a pin 60 on the top carriage to lock the top and bottom carriages in the closed position.

[0040] As best seen in Figure 6, the top carriage includes two interior side walls 62 (only one being shown) that extend generally parallel to the side walls 32 from front to rear so as to define an elongated channel 64 at each side of the top carriage. A cap 66, generally U-shaped in cross section, is attached

to each side and interior wall 32, 62 respectively to close off the channels. The bottom face 68 of each cap provides a sealing surface along each side of the top carriage. Along the front wall 34 of the top carriage is a sealing flap 70. This flap along with a pair of similar sealing flaps 72 at the rear of the top carriage (Figure 3) and the sealing surfaces provided by the bottom faces of caps 66 help to contain fluids within a closed scrubber.

[0041] Each of the interior walls 62 has a plurality of spaced notches 65 (Figures 5 and 6). The notches on opposite interior walls 62 are paired and receive the ends of the brushes 100a as described further hereinbelow.

[0042] As best seen in Figure 4, the interior of the bottom carriage 24 includes two interior side walls 74 that extend generally parallel to the side walls 48 from front to rear so as to define an elongated channel 76 at each side of the bottom carriage. A cap 78, also generally U-shaped in cross section, is attached to the side and interior walls 48, 74 respectively to close off the channels. The top face 80 of each cap 78 provides a sealing surface along each side of the bottom carriage. Along the front wall 50 of the bottom carriage is a sealing flap 82. This flap 82 along with a similar sealing flap 82 along an interior transverse dividing wall 84 towards the rear of the bottom carriage and in conjunction with the sealing surfaces provided by the top faces 80 of caps 78 help to contain fluids within a closed scrubber.

[0043] In this respect, when the top and bottom carriages are in a closed position as shown in Figures 1-3, the sealing surfaces defined by the top faces 80 of caps 78 press against the corresponding sealing surfaces defined by the bottom faces 68 of the caps 66 on the top carriage. Likewise, the flaps 70 and 82 cooperate by pressing one against the other to seal off the front and rear of the scrubber. Thus in a closed position the interior volume of the scrubber between the top and bottom carriages as bounded in part by the sealing faces 68, 80 and flaps 70, 82 defines a relatively liquid tight cleaning zone 49.

[0044] Referring again to Figure 4, it should be appreciated that space between the interior transverse dividing wall 84 and the front wall 50 of the bottom carriage defines a fluid collecting sump 85. This sump preferably has a

false bottom 86 that slopes downward front to back. An opening 88 in the dividing wall 84 drains fluid into a drainage chamber 90, which in turn communicates with the scrubber outlet 56 (Figures 1 and 3). A fan 92 in the chamber (see Figure 3) is operated to help expel fluids from the sump through outlet 56. Operation of the fan also creates a slight negative pressure within the closed scrubber to help prevent the escape of fluids from between the closed top and bottom carriages.

[0045] Next to the drainage chamber 90 is a motor compartment 94. This compartment provides a liquid-free environment for an electric motor 96 that is used to drive the fan and the scrubber brushes 100. The vertical support 26 sits over the drainage chamber 90 and motor compartment 94. A front face 102 of the vertical support is disposed generally at an inclined angle to support the top carriage in a closed position.

[0046] Referring now to Figures 1, 3, and 5, the top carriage 22 is shown as having a plurality of top brushes 100a. These brushes extend across the top carriage wherein the ends of the brushes are journaled to the interior side walls 62. Likewise, the bottom carriage 24 has a plurality of bottom brushes 100b that extend across the bottom carriage wherein the ends of the brushes are journaled to the interior side walls 74.

[0047] As described above, the interior side walls 62 of the top carriage each has a plurality of spaced notches 65 (also seen in Figure 6). The notches on opposite interior walls 62 are paired and receive the ends of the brushes 100a. In a similar manner, the bottom carriage has its interior side walls 74 provided with a plurality of spaced notches 75 (Figures 4 and 5) that are paired to receive the ends of the brushes 100b.

[0048] The disposition of the brushes 100a and 100b allows the brush bristles to pass through the cleaning zone 49 when the top and bottom carriages are closed and the brushes are rotated. Rotation of the brushes is accomplished through a system of gears and timing belts driven by the motor 96.



[0049] The drive system for rotating the brushes 100a and 100b is shown in Figure 7. As shown in Figure 7, there are cooperating components of the drive system in the top carriage 22, bottom carriage 24 and in the vertical support 26. The drive system includes a sprocket 104 driven by the motor 96. The sprocket 104 meshes with a drive gear 106. The drive gear 106 in turn is connected by a timing belt 108 to a driven gear 110 at the top of the vertical support 26. It is important to note that the rotational axis of this driven gear 110 is the axis of the hinge 28 holding the top carriage 22 to the vertical support so the axis of the driven gear 110 corresponds to the pivot point 30. A second timing belt 112 extends from the driven gear and drives a plurality of sprockets 114.

[0050] The sprockets 114 are all journaled to a drive support bar 116. This support bar is fixed to an interior side wall 62 of the top carriage within one of the channels 64 (shown in Figure 6). The sprockets 114 are spaced along the support bar so that each sprocket 114 aligns with one of the notches 65 along one side of the top carriage. A driven end of each brush 100a extends through the notch for connection to a sprocket. After the support bar is fixed in its channel, the channel is covered by one of the channel caps 66. The opposite end of each brush 100a is supported in a bearing (not shown) located in the paired notch 65 on the opposite interior side wall 62. Preferably the ends of the brushes are releaseably engaged with the sprockets 114 and bearings so that the brushes can be easily removed and replaced.

[0051] The drive gear 106 also meshes with a driven gear 118. The driven gear 118 is connected by a timing belt 120 to a first sprocket 122 associated with the bottom carriage 24. A second timing belt 123 extends from the sprocket 122 and drives a plurality of like sprockets 122. Each of the sprockets 122 is journaled to a drive support bar 124. This support bar is fixed to one of the interior walls 74 of the bottom carriage 24 within one of the channels 76 (shown in Figure 4). The sprockets are spaced so that each sprocket 122 aligns with one of the notches 75 along one side of the bottom carriage. A driven end of each brush 100b extends through the notch for

connection to a sprocket 122. After the support bar 124 is fixed in its channel, the channel is covered by one of the channel caps 78 as shown in Figure 4. The opposite end of each brush 100b is supported in a bearing (not shown) located in the paired notch on the opposite interior side wall 74.

[0052] Preferably the ends of the brushes 100b are releaseably engaged with the sprockets 122 and bearings so that the brushes can be easily removed and replaced. A thin gasket may be used depending upon the degree of leak prevention from the sump 85 that is desired. Additionally, an overflow hole (not shown) in the transverse wall is positioned to prevent fluid from rising above the brush drives.

[0053] With the arrangement as shown in Figure 7, the motor 96 drives the lower set of sprockets 122 and these in turn drive each of the brushes 100b in the bottom carriage. Thus, when the motor 96 is activated, the lower sprockets 122 spin, and in doing so spin the bottom brushes 100b. The motor 96 further drives the exhaust fan 92 in the drainage chamber 90 that communicates with the outlet 56. The exhaust fan 92 is arranged to vent waste fluids from the bottom carriage 24 out through the outlet 56. As noted above, the bottom carriage preferably has a sloped bottom 86 to facilitate the flow of waste towards the opening 88 and outlet 56. Operation of the exhaust fan also creates a slight negative pressure within the scrubber 20 and this serves to reduce fluids from leaking from the scrubber 20.

[0054] The motor also drives the upper set of sprockets 114 and these in turn drive each of the brushes 100a in the top carriage. The disposition of the brushes allows the brush bristles to pass through the cleaning zone 49 between the carriages when the brushes are rotated. Preferably there is some space (the cleaning zone 49) between the bristles of the top and bottom brushes so that the top and bottom brushes do not touch.

[0055] However, it is preferred that each set of brushes 100a and 100b be disposed so there is some interference between the bristles as the brushes of each set rotate through the cleaning zone 49. This allows the brushes in a set to clean each other wherein the bristles of one brush of the set contact the

bristles of another brush in the set. For example, as shown in Figure 7 all the lower brushes 100b rotate in the same direction. This means that where the brushes touch, there is peripheral interference in that the bristles are moving in opposite directions. This peripheral interference causes the brushes to clean one another.

[0056] While rotation of the brushes in the same direction is preferred, the sprockets and timing belts may be arranged such that adjacent ones of the top and bottom brushes 100a and 100b rotate in the same or opposite directions. As noted above, the ends of the brushes 100a and 100b preferably are snapped into and out of position with the sprockets and bearings in the walls 62, 74 of the top and bottom carriages respectively. This permits replacing and/or interchanging the bottom and top brushes with brushes having bristles comprising different properties of stiffness, composition, texture, etc. so the brushes can be changed to accommodate different scrubbing situations.

[0057] In operation, a user opens the scrubber 20 by raising the top carriage 22 as shown in FIG. 5 to gain access to the scrubber interior. An object to be cleaned is placed into the scrubber. The top carriage is closed and latch 58 is engaged to lock the top and bottom carriages in a closed position. In the closed position, the hinge 28 aligns the top carriage 22 and bottom carriage 24 causing the top brushes 100a and bottom brushes 100b to become substantially parallel, as shown in FIGS. 1, 3 and 7. The support face 102 of the vertical support 26 is disposed at an inclined angle and there is a complimentary angled surface 103 on the top carriage. Accordingly, the hinge 28 between the top carriage 22 and bottom carriage 24 also is angled. This not only enables opening and shutting of the scrubber 20, but also allows the angled support face 102 to support a portion of the weight of the top carriage when the scrubber is closed. The support offered by the support face 102 for the complimentary surface 103 on the top carriage prevents excessive forces from causing the top and bottom brushes 100a, 100b respectively to touch.

[0058] Figure 8 shows the cleaning of a shovel, rake or other implement having a handle 126 that extends out of the scrubber. When the

carriages are in a closed and locked position, the flaps 70,82 drape around the handle and deform so as to provide a seal around the handle extending from the scrubber. If the object to be cleaned does not have a handle, it is held by tongs or other holder that extend from the scrubber. With the tongs or object handle extending outside the cleaning zone, the object can be moved and manipulated within the scrubber by the user to contact all surfaces against the brushes 100a and 100b.

[0059] The latch 58 is used when the user places the objects to be cleaned inside the scrubber 20 and closes the top carriage 22 downwardly onto the bottom carriage 24. If the object to be cleaned is large, the latch 58 may be left unlatched so the top and bottom carriages are ajar. In extreme cases and for larger objects, the top carriage may be partly open.

[0060] After the object is in position, the user presses the trigger 46 that starts the motor 96 and spins the brushes. Fluids, steam, and a cleaner are introduced as needed through the respective fluid and cleaner inlets 40, 42. Operation of the motor 96 drives the vertical belt 108, which in turn drives the driven gear 110 that drives the top carriage drive belt 112. This driven gear 110 rotates about an axis 30 that corresponds to the axis of the hinge 28. With this arrangement, there is no stretching of the vertical belt 108 and top carriage drive belt 112 when the top carriage 22 is swung through an arc to open and close the scrubber. In this respect as the scrubber top carriage 22 is opened the vertical drive belt 108 and the top carriage drive belt 112 simply rotate around the hinge axis (pivot point 30) and do not stretch. This ensures smooth operation when closing and opening the scrubber. Also with this arrangement, neither the vertical belt 108 nor top carriage drive belt 112 is tightened, loosed, damaged, or misaligned by the repeated opening and closing of the top carriage 22.

[0061] For cleaning smaller objects a holding basket 128 is provided as shown in Figures 9 and 10. The basket may comprise a mesh basket made of a metal, plastic, or other durable material and combinations thereof holds small objects and prevents the free movement of the objects in the scrubber

cleaning zone. The basket 128 has top and bottom portions 130, 132 respectively that are hinged together at 134 so the basket can be fully opened. Legs 136, 138 serve to support the basket in the cleaning zone.

[0062] The basket is sized so as to fit between the top and bottom brushes 100a and 100b, as shown in FIG. 10. It is noted that the mesh structure of the basket 128 allows the brush bristles to penetrate the basket and scrub the articles held in the basket. The basket is supported in the cleaning zone 49 by its legs 136, 138 that stand on the sloped bottom of the bottom carriage 24. To maintain the basket level in the cleaning zone, the basket legs 136, 138 are of an uneven height or are adjustable.

[0063] In operation and with the top and scrubber closed, the flaps 70, 82 and the seal as formed between the faces 68, 80 of the caps 66, 78 keep the cleaning fluids within the scrubber interior and the exhaust fan 92 moves the waste out of the scrubber through the fluid outlet 56. After cleaning, the scrubber 20 is opened and the article is removed. The same process occurs when smaller articles to be cleaned are loaded into the basket 128 and then placed in the scrubber interior 52. In cases where the article to be cleaned is too large to fit into the scrubber, the user may place only a portion of the article to be cleaned in the scrubber at a time and then repeatedly open and close the top carriage while the brushes are spinning so different portion of the article are inserted and cleaned.

[0064] Preferably, the brushes 100a and 100b are provided with a bristle structure that tends to direct fluids inward towards the center of the cleaning zone. This aids in preventing the escape of fluids from between the faces 68, 80 of the caps 66, 78 respectively. The bristle structure also preferably directs fluids towards the rear of the scrubber. Thus, the spinning of the brushes acts to direct the fluids inward away from the sides 32, 48 and towards the outlet 56 at the rear of the scrubber.

[0065] An embodiment of the invention as been described wherein the support bars 116, 124 are fixed to the interior walls 62, 74 of the top and bottom carriages respectively. However these support bars may be spring loaded or be

adjustable so as to provide greater flexibility for accommodating articles of various sizes. For example Figure 7 shows that the support bars may be connected to the carriage top 38 and bottom 54 by springs 140, 142 respectfully. This spring loading biases the support rods 116, 124 (and therefore the brushes 100a, 100b) together and towards the center of the cleaning zone. However, if a large article is placed in the cleaning zone, the springs allow the support bars (and therefore the brushes) to move apart to accommodate the larger article within the closed and latched scrubber.

[0066] The drive system has been described as comprising a system of sprockets and timing belts. However it should be appreciated that the brushes also can be driven by a system of gears that mesh to transfer the rotary drive of the motor to each of the brushes 100a and 100b. In this case the gears would replace the timing belts 112 and 123. Meshing gears also can replace the timing belt 108 so long as the driven gear 110 is retained that has its rotational axis the axis of the hinge 28.

[0067] Thus, the present scrubber 20 of the present invention provides for a methodology of cleaning any of a plurality of differently sized articles with brushes of differing stiffness in rapid reliable fashion. It is further noted the scrubber 20 may be of a small size such that it is readily transportable.

[0068] In other embodiments, the scrubber 20 may be comprised of plastic components such that it is useable in houses and kitchens. In other embodiments the scrubber 20 may comprise industrial sized parts and be made of heavy duty metal components. The scrubber may be battery powered and may be embodied so that the cleansing fluids are filtered and recirculated through the scrubber 20. This provides an economy both in terms of cost and the amounts of cleaning fluids used.

[0069] In yet other embodiments, the vertical support member 26 may comprise means for vertical adjustment, which allows the distance between the top and bottom carriages 22, 24 respectively, to be varied by moving them closer or farther apart as desired in order to accommodate differently sized

objects. This embodiment however requires the replacement or adjustment of the timing belt 108 as the height of the support member changes.

[0070] It will be appreciated by those skilled in the art that while the scrubber is described in detail in connection with the particular embodiments and examples, the present scrubber is not necessarily so limited and that other embodiments, examples, uses, and modifications and departures from the embodiments, examples, and uses may be made without departing from the scrubber as claimed.

[0071] Having described the invention in detail, what is claimed as new is: